Baumer

Baumer-GAPI Viewer v1.7

User's Guide for Baumer-GAPI Test Tool

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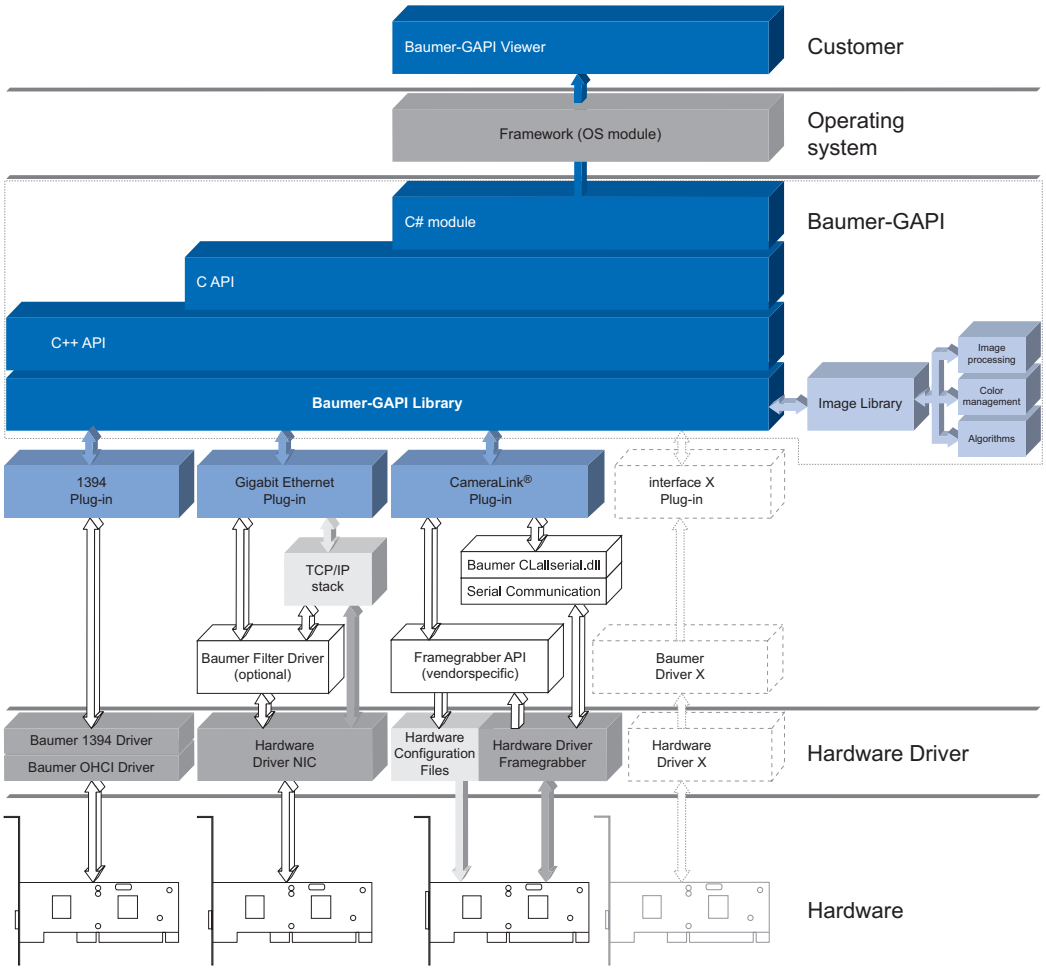


Figure 1 ►
The Baumer-GAPI stack

1. Introduction

The GAPI Viewer, part of the generic application programming interface from Baumer, is the perfect evaluation tool for all Baumer cameras. It allows you to investigate the extensive functionality within our innovative cameras. Regardless if you consider GigE Vision™ or FireWire™ as your application interface the Baumer-GAPI Viewer will provide you an easy to use graphical user interface to test you specific camera features.

2. Baumer-GAPI SDK

Baumer-GAPI stands for Baumer "**G**eneric **A**pplication **P**rogramming **I**nterface". With this API Baumer provides an interface for an optimal integration and control of Baumer Gigabit Ethernet (GigE) and Baumer FireWire™ (IEEE1394) cameras.

This software interface thus permits the option of switching to other camera models or interfaces. It also allows the simultaneous operation of Baumer cameras with a Gigabit Ethernet and FireWire™ interface.

This GAPI supports both Windows® (XP and Vista) and Linux® operating systems in 32bit as well as in 64bit. It provides interfaces to several programming languages as C, C++ and to the .NET™ Framework on Windows®, Mono on Linux® operating systems respectively, which enables the use of other languages such as C# or VB.NET.

API:
API stands for "Application Programming Interface". An API is a software interface between two programs, usually between operating system and an application.

The software package includes a setup tool, the Software Development Kit (SDK) with numerous detailed program examples, as well as help files and the Baumer-GAPI Viewer for evaluation of all camera functions.

2.1 Baumer-GAPI Stack Components

2.1.1 Hardware-Specific Components

Because the Baumer-GAPI supports several hardware interfaces, which need to be handled in different ways, there are some interface-specific components integrated into the Baumer-GAPI SDK to keep it generic.

2.1.1.1 CameraLink®

The CameraLink® interface was especially developed for cameras in machine vision applications and provides high transfer rates and low latency. Depending on the configuration (Base, Medium or Full) the transfer rate adds up to 625 MBytes/sec.

- Base (max. 24 Bit per Clock)
- Medium (max. 48 Bit per Clock)
- Full (max. 64 Bit per Clock)

Notice
Cameras of the Baumer SXC series are equipped with a CameraLink® Base interface.
Cameras of the Baumer HXC series are equipped with a CameraLink® Full interface.

2.1.1.2 Gigabit Ethernet

Working with Baumer Gigabit Ethernet cameras requires the installation of appropriate hardware and a network interface card (NIC) which support GigE, on your PC. Baumer recommends the employment of NICs with an Intel® chipset. The hardware is delivered with a hardware driver which is required in order to establish communications between hardware and software.

After the hardware and its driver have been installed, the TCP/IP stack which also covers the necessary UDP is activated. This protocol family controls the data transfer between networked devices.

In default versions, both control and stream data pass through the TCP/IP stack and for transfer to the Baumer interface plug-in - in this case, the GigE Vision™ plug-in.

This plug-in provides interface-specific preprocessing of Baumer-GAPI commands. The GigE Vision™ plug-in ensures a package structure in accordance with the GigE Vision™ standard.

With Baumer Filter Driver (only on Windows® operating systems) the option of separating stream data from network and control data is available. In fact, this allows network and control data to continue to pass through the TCP/IP stack, but stream data are transferred directly to the GigE Vision™ plug-in. Use of the Baumer Filter Driver increases your system's performance and is therefore recommended.

2.1.1.3 FireWire™

As with Gigabit Ethernet you also need the applicable hardware to work with Baumer FireWire™ cameras.

Standard Windows® operating systems require an OHCI (Open Host Controller Interface) driver.

Because Microsoft® OHCI possesses a bug to handle FireWire™ b at a transfer rate of 800 Mbit/sec, Baumer needed to develop its own OHCI driver to fix this and other bugs. Therefore the Baumer OHCI driver is recommended in order to provide the best possible Baumer camera operation.

Linux® and FireWire™:
For the moment Linux® is supported only by Baumer FireWire™ cameras of the FWX series.

On Linux® the 800Mbit/sec bug does not exist, so the standard OHCI which is integrated in the kernel can be used.

The Baumer 1394 driver is approved for optimal communication between software and FireWire™ devices.

Analogous to the GigE Vision™ plug-in, the 1394 plug-in provides an interface-specific preprocessing of the commands of Baumer-GAPI.

2.1.2 Baumer-GAPI Modules

The Baumer-GAPI is partitioned into several modules. Depending on your chosen programming language, either more or fewer of these may be used.

2.1.2.1 Baumer-GAPI Library

As previously stated, Baumer-GAPI supports several programming languages to create an application. Therefore the Baumer-GAPI Library represents a uniform API for the cross-interface camera control. Here, global camera control functions are defined.

2.1.2.2 Image Library

This library includes several functions for image processing and image editing.

2.1.2.3 Programming Languages

As shown in Figure 1, the implementation of C++, C and C# is realized hierarchically.

This means that the C++ API resorts directly to the Baumer-GAPI library. Code in C resorts to the Baumer-GAPI library via C++ API.

When accessing the Baumer-GAPI library, C# code bypasses both C API and the C++ API.

2.1.3 Framework

Framework:
Baumer-GAPI v1.5 is tested with
Linux®: Mono 1.2.4
Windows®: .NET™ 2.0

A Framework represents a software platform, which provides a runtime environment, an API and several services to the programmer. It is required, for example, when programming in C# or VB.NET.

2.2 Gerneral System Requirements

	Single-camera system		Multi-camera system	
	Minimum	**Recommended**	**Minimum**	**Recommended**
CPU	Intel® Pentium®4 or comparable processor	Intel® Core™ Duo comparable processor		
Clock	2.5 GHz	> 2.5 GHz	2.5 GHz	3 GHz
RAM	1024 MB	2048 MB	2048 MB	> 2048 MB
Operating system (OS)	Microsoft® Windows® XP incl. Service Pack 2 or higher Microsoft® Windows® XP x64 incl. Service Pack 2 or higher Microsoft® Windows Vista™ 32 / 64 bit systems Microsoft® Windows® 7 32 / 64 bit systems Linux® 32 / 64 bit systems from Kernel 2.6.xx			
Graphics	recommended resolution 1280 x 1024, color depth at least 16 bit			
Framework (optional)	Windows® OS: .NET™ Framework 2.0 or higher Linux® OS: Mono 1.2.4 or higher			

2.3 Installation

The Baumer-GAPI Viewer is part of the installation package Baumer-GAPI.

The installation procedure on Microsoft® Windows® is described in "Baumer-GAPI SDK Installation Guide for Gigabit Ethernet" for Gigabit Ethernet systems or rather in "Baumer-GAPI SDK Installation Guide for FireWire™" for FireWire™ systems.

3. Baumer-GAPI Viewer

3.1 Central Idea

The Baumer-GAPI Viewer was developed as a complex example program with open source code. The tool is written in the programming language C# and serves as a reference project for the interaction of C#, Microsoft's .NET™ Framework (and/or Mono™) and Baumer's API.

3.2 Program Start

The Baumer-GAPI Viewer is started by "Start" → "All Programs" → "Baumer" → "Baumer Gapi Development Kit" → "Baumer Gapi Viewer xx[1)]".

3.3 Main Window

Afterward the main window (Fig. 1) appears.

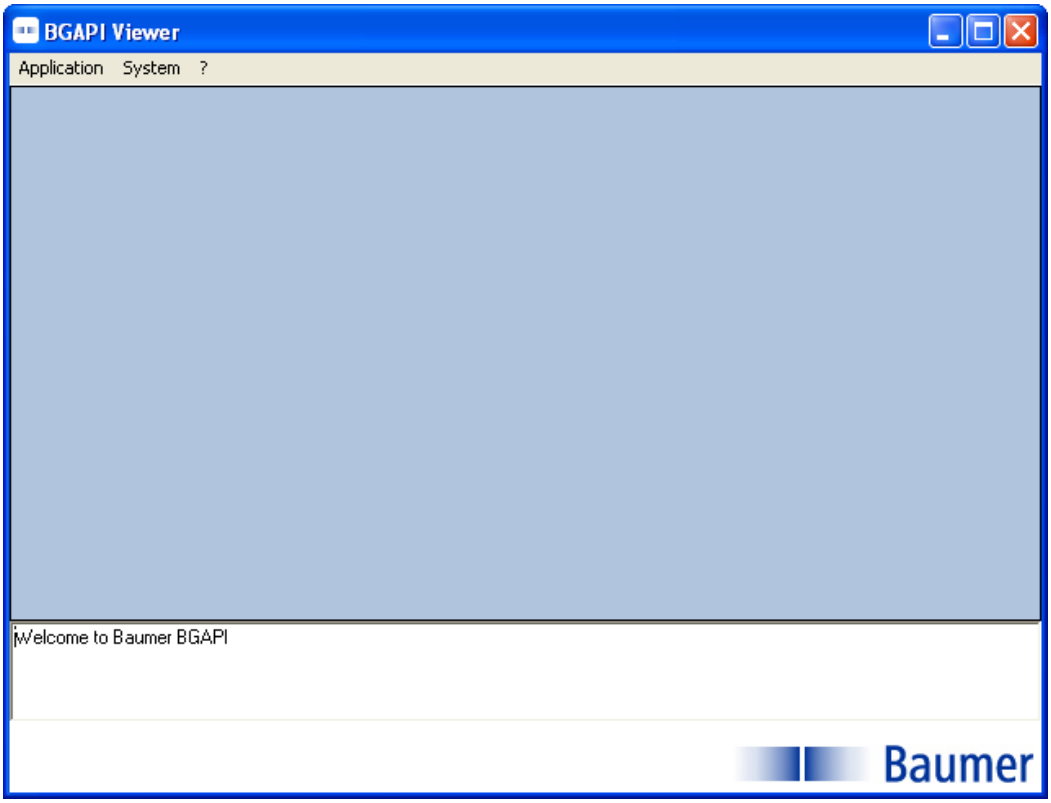


Figure 1 ►
Main window of the Baumer-GAPI Viewer.

Here you will find a menubar with three menus, which are described more detailed within the next paragraphs.

3.3.1 Menu Application

By selecting the menu item "Exit" the tool can be aborted.

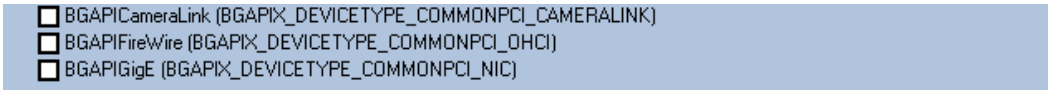
3.3.2 Menu System

This menu contains two items: "Initialize" and "Options".

3.3.2.1 Initialize

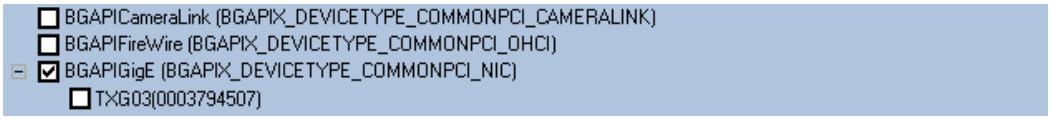
By selecting this item, the tool scans for available interface plug-ins. Found interfaces will be displayed (Fig. 2).

1) xx stands for 32 or 64, which means 32 / 64 bit with respect to the employed OS



◀ **Figure 2**
Available Baumer-GAPI interface plug-ins.

Once one of these interfaces is selected, the software scans for available cameras and displays them below the interface (Fig 3).



◀ **Figure 3**
Gigabit Ethernet camera found.

After selecting a camera, the camera window (please see section 3.4) will be opened.

3.3.2.2 Options

Here several options regarding to the interface and the camera can be adjusted. Further information on the options window will be given in section 3.5.

Notice
This only makes sense after initialization!

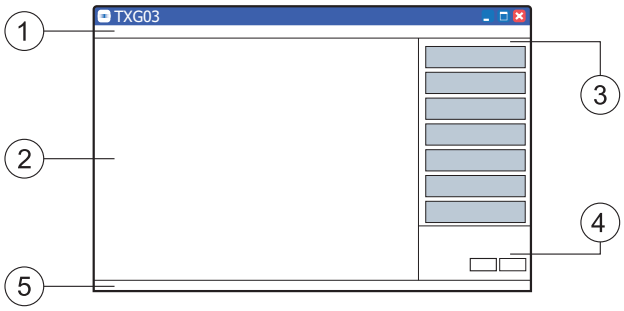
3.3.3 Menu "?"

The only item here is "Info", which causes the display of the Baumer-GAPI version.

3.4 Camera Window

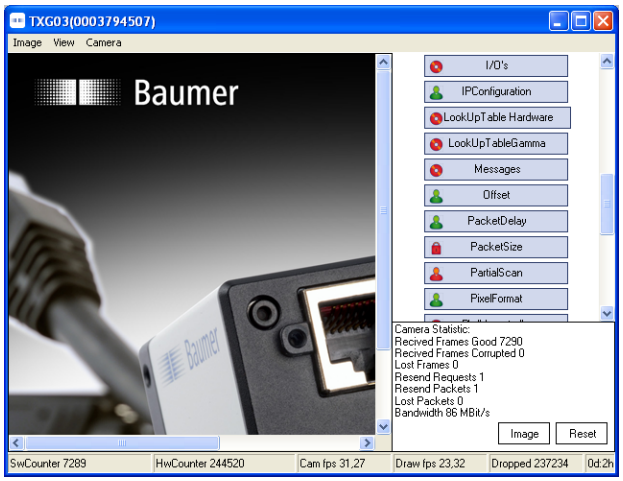
The camera window (Fig. 4) is fielded in five areas:

- Menu Bar (1),
- Image View (2),
- Feature Control (3),
- Statistics (4) and
- Status Bar (5)



◀ **Figure 4**
Framing of the camera window.

which are described in the following paragraphs.



◀ **Figure 5**
Screenshot of the camera window.

3.4.1 Menu Bar

The menu bar contains three menus:
- Image,
- View and
- Camera.

3.4.1.1 Menu "Image"

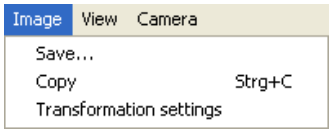


Figure 6 ►
Menu "Image"

This menu provides the possibilities of saving images (menu item "Save...") and copying image content to the clipboard (menu item "Copy") as well as image transformation options.

Transformation Control:

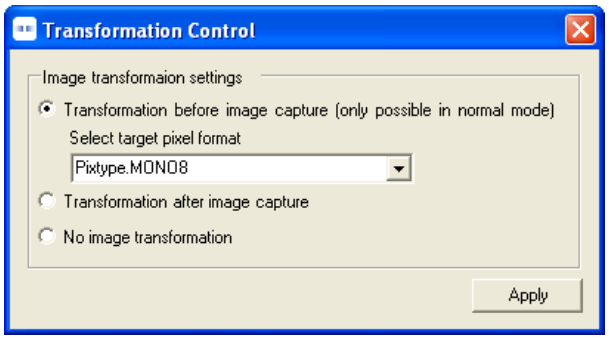
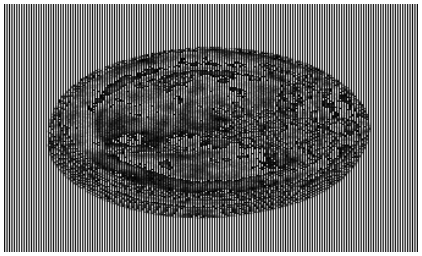


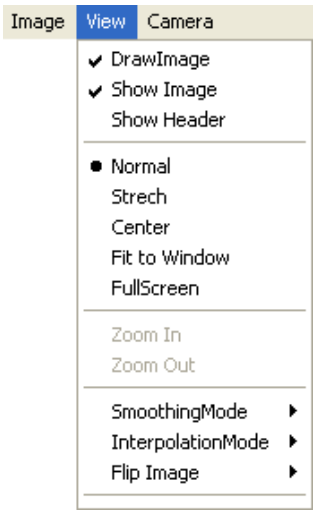
Figure 7 ►
Transformation control window of the Baumer-GAPI Viewer.

These settings are controls for pixel transformation. For further information please see "Baumer-GAPI SDK v1.x Programmer's Guide".

Transformation Setting	Description
Transformation before image capture	After the creation of an empty image object (container), the destination pixel format for this container is set. The transformation occures within the image buffer. Regardless to the adjusted destiantion format, the Baumer-GAPI viewer will display the recorded image in a presentable format like mono or RGB.
Transformation after image capture	After the image acquisition, the image data gets copied and transformed. Regardless to the adjusted destination format, the Baumer-GAPI viewer will display the recorded image in a presentable format like mono or RGB.
No image transformation	Here a display of the buffer content occures one on one - as raw data. This may cause irritating effects to the user.

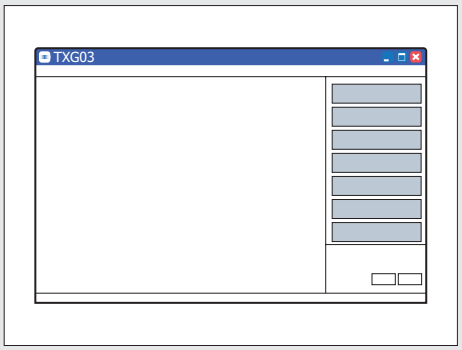
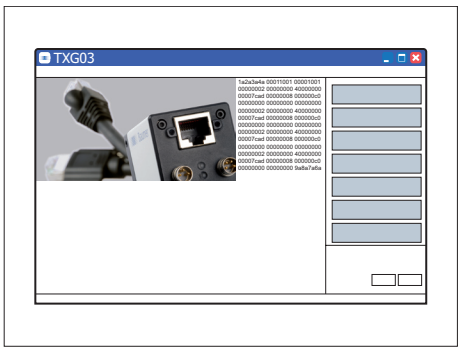
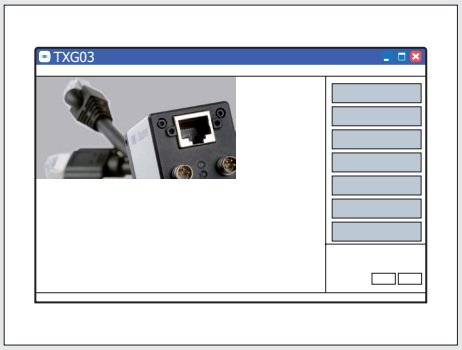


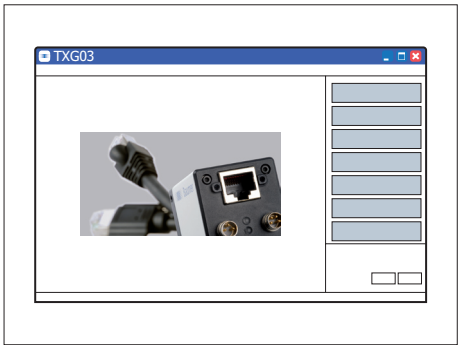
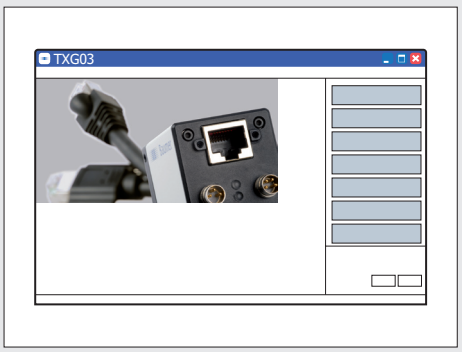
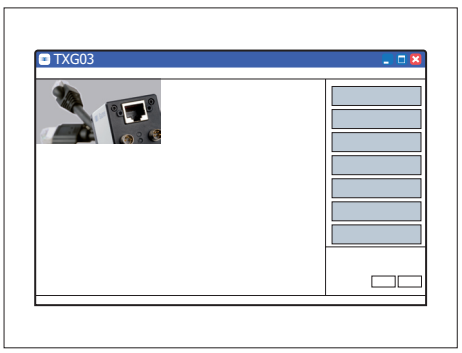
3.4.1.2 Menu "View"

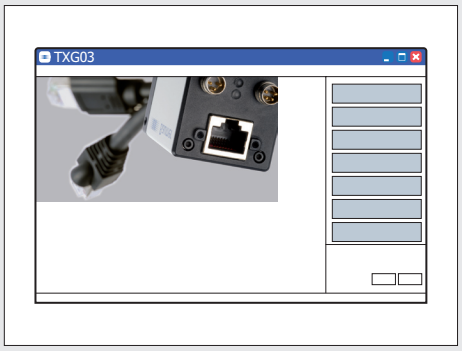
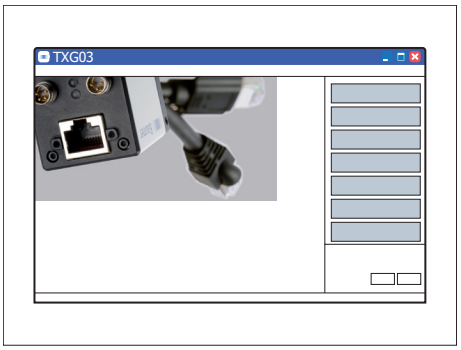
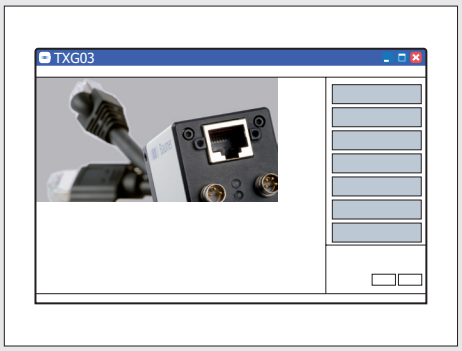


◄ **Figure 8**
Menu "View"

This menu provides several functions for manipulation of the shown image:

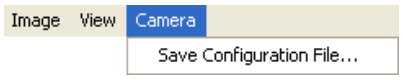
Menu item	Description	Result
Draw Image	If this item is selected, every recorded image is drawn.	This can be tested in free running mode (set by default). Let the camera run and look to a moving target. Deselecting this menu item will result in a freeze image.
Show Image	Here the image display can be switched on and off.	
Show Header	This item enables the display of header information beside the image. **Notice** This function requires "Normal" to be activated.	
Normal	Selecting this item results an 1:1 display of the recorde images. Zoom factor 100%.	
Strech	By this menu item, the zoom functions are enabled.	

Menu item	Description	Result
Center	This option causes the displayed image (1:1) to be centered within the "Image View".	
Fit to Window	Selecting this item results in an adaptation of the image to the "Image View"	
FullScreen	This item activates the full screen mode. **Notice** Full screen mode can be left by pressing the "Esc" key.	
Zoom In	By this item, the displayed image can be scaled up. **Notice** This function requires "Stretch" to be activated.	
Zoom Out	By this item, the displayed image can be scaled down. **Notice** This function requires "Stretch" to be activated.	

Submenu	Menu item	Description / Result
SmoothingMode	AntiAliasDefault HighQuality HighSpeed None	
InterpolationMode	Bicubic Bilinear Default High HighQualityBicubic HighQualityBilinear Low NearestNeighbor	.NET™ specific functions
Flip Image	Flip X	
	Flip Y	
	Flip XY	
	Flip None	

3.4.1.3 Menu "Camera"

Figure 9 ►
Menu "Camera"



Here a copy of the configuration file (.xml) of a Gigabit Ethernet camera can be stored to the PC.

3.4.2 Image View

Here the last recorded image is diplayed. Thereby the settings, done in Feature Control, are employed.

3.4.3 Feature Control

By selecting a feature (button) in this area, an associated parameter list is opened.

The availability and/or the status of a particular feature is indicated by several icons.

Icon	Status
	This feature is enabled.
	This feature is disabled.
	This feature is not supported by the software.
	This feature is not supported by the hardware.
	Depending on an other feature, this one is temporary locked.
	Feedback error on feature.

Some of the features are camera-specific.

Therefore the features are labeled within this document:

Label	Description
G	This feature is available on Gigabit Ethernet cameras.
CL	This feature is available on CameraLink® cameras.
FW	This feature is available on FireWire™ cameras.
S	This feature is available on special cameras only.
	This feature is available on monochrom cameras.
	This feature is available on color cameras.

Notice

The camera functions are described more detailed in the following documents:
- Baumer TXG - User's Guide for Gigabit Ethernet cameras (referenced as User's Guide)
- Baumer-GAPI SDK Programmer's Guide (referenced as Programmer's Guide)

3.4.3.1 Basic API

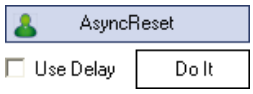
CL G FW

Here the access to the features of the Basic API is possible.

These features are necessary in special cases only.

3.4.3.2 AsynchReset

G FW



On asynchronous reset the camera is stopped immediatly. Thus the current image is not read out completely and will be upcast. Afterwards the camera continues with the next image.

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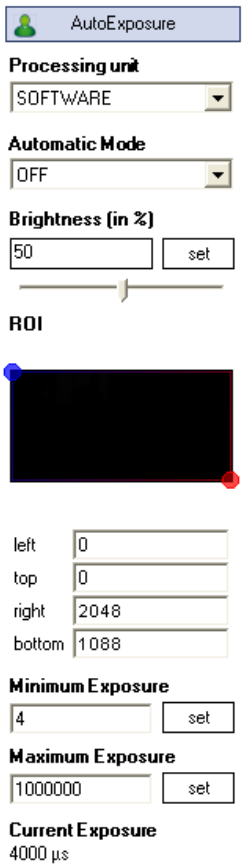
3.4.3.3 AutoExposure

CL G FW



By this feature Baumer FireWire™ cameras provide the possibility to set the exposure time internal automatically. With the other cameras, the exposure time is calculated with external software (BGAPI-Viewer).

Once the feature is enabled, a desired brightness level (measured in grayscales 0-255 and adjustable in %) can be adjusted for a target area (ROI).

The ROI is adjustable by the blue and the red circle and by entering the coordinates.

3.4.3.4 BrightnessCorrection

CL G FW

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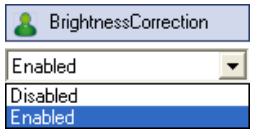

On Binning Mode, an aggregation of charge carriers takes place. This may cause an overload and therefore an overexposed image. For prevention of this effect, the Brightness Correction was introduces.

Notice

This feature is available on Binning Mode only.

3.4.3.5 Camera Information

CL G FW

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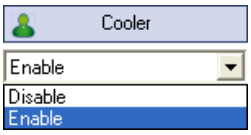
Here several information on the employed camera, such as serial number, model name and firmware version, are provided.

3.4.3.6 Cooler

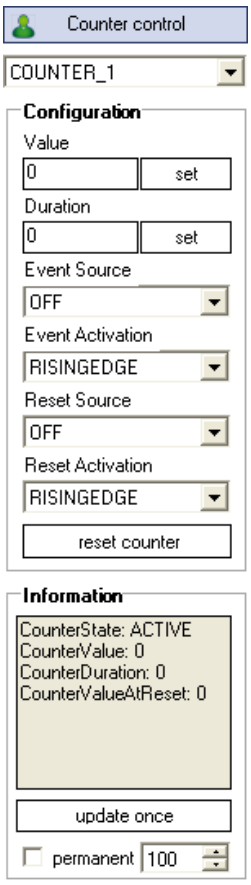
S



By this feature the integrated cooler can be enabled or disabled.

3.4.3.7 Counter control

G



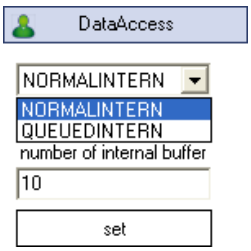
With this feature you can choose countable Events. The count values of these Events are readable and writable.

When the set value is 0, then the maximum number of countable events is 2^{32}-1 (4294967295).

If you specify a value, then the counter counts up to that value and stops. Then a GigE event is triggered ("Counter1/2End") and the status of the counter changes from ACTIVE to the readable status COMPLETED.

3.4.3.8 DataAccess

CL G FW



Here some parameters for the buffer management can be adjusted.

Notice

This feature is only available when the camera is stopped.

3.4.3.9 DefectpixelCorrection

CL G

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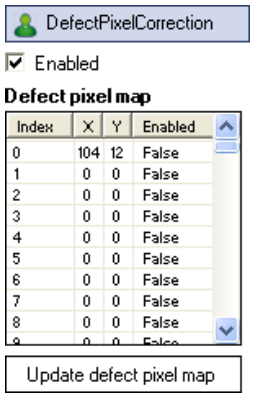


During the lifecycle of a camera, hot or cold pixels can develop. In order to correct this pixels, the so-called defect pixel map (or list) was introduced to Baumer cameras.

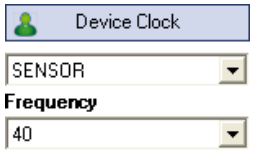
By this list, Baumer offers the possibility to implicate additional pixels to the correction procedure.

Notice

The coordinates reference to Full Frame Format.

3.4.3.10 Device Clock

CL G



The speed (Mhz) to readout the sensor can be configured by using this feature.

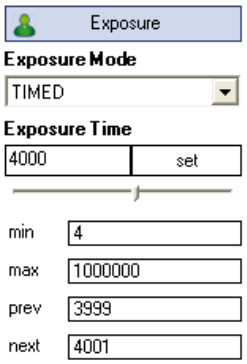
By reducing the clock, you can prevent buffer overflows, reduce power consumption and can use longer cables.

Notice

The offered speed are dependet from the connected camera.

3.4.3.11 Exposure

G FW



Here the exposure time can be adjusted via entry or slider.

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Notice

The values are given in µsec. For the choose of a Exposure Mode you must be enable the Trigger.

3.4.3.12 Flash

G FW

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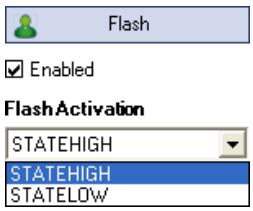


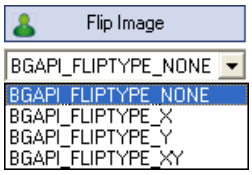
By this feature the flash output can be controlled.

Notice

FlashActivation relates to the incoming trigger signal.

3.4.3.13 Flip Image

CL G FW



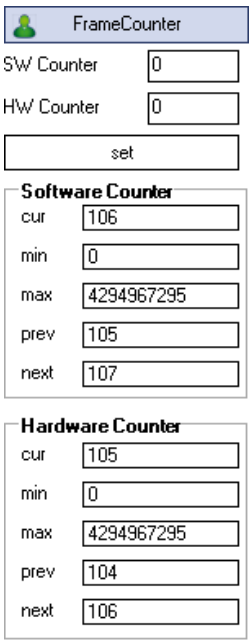
Here you can flip the image in the camera.

Notice

With the function in the menu bar (View → Flip image) you only rotate the view in the viewer!

3.4.3.14 FrameCounter

G FW

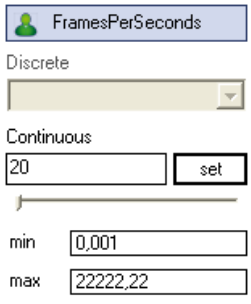


Here the possibility of predefining a value for the software counter as well as for the hardware counter, at any time, is given.

Value "0" means a reset of the respective counter.

3.4.3.15 FramesPerSeconds

CL G FW



By this feature the frame rate of the camera can be predefined.

Notice

Special value 0 = "Freerun"Camera takes images at full frame rate without external trigger.

3.4.3.16 Gain

CL G FW

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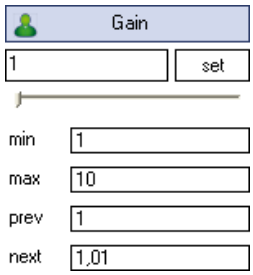

Here the amplification factor can be adjusted via entry or slider.

3.4.3.17 Gamma

CL G S

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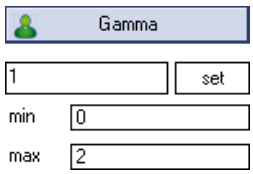

Here the corretion factor γ for the gamma correction can be set. Thereby γ is adjustable from 0.001 to 2.

Notice

LookUpTable Hardware needs to be enabled to activate this feature.

3.4.3.18 HeartBeatTimeout

G

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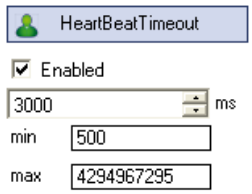

This feature provides the possibility of setting the heartbeat cycle.

Thereby the cycle duration (heartbeat timeout) can be adjusted from 500 msec to 2 billion msec.

3.4.3.19 ImageFormat

CL G FW

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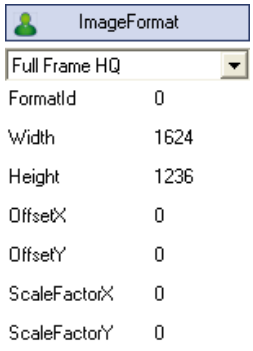
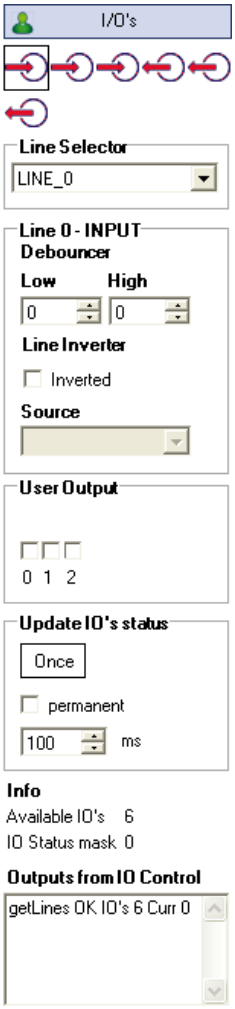


Here the adjustment of the image format takes place.

Within the drop down menu all available image formats of the employed camera are displayed.

3.4.3.20 I/O's

CL G



This feature offers the possibility of configuring the digital in- and outputs of the camera.

For an input, the debouncing times $t_{Debounce\ Low}$ and $t_{Debounce\ High}$ can be adjusted in µsec. The line can be inverted.

For an output, the respective signal source can be selected.

Further you can set the update time for the IO-Status.

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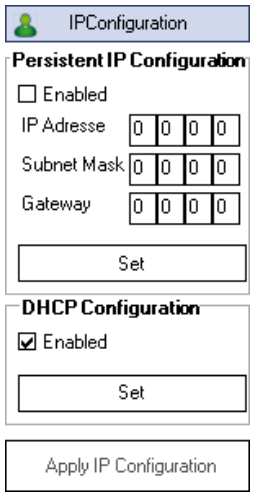
3.4.3.21 IPConfiguration

G



By this feature, the camera can be switched from LLA (start behaviour) to DHCP or Persistent IP.

Procedure:

- Enable the desired mechanism of connection establishment
- On persistent IP please enter the desired parameters
- Confirm the settings by clicking the "Set" button

After manipulation of any of this parameters the camera needs to be deenergized.

Notice

Please close the Baumer-GAPI Viewer before deenergizing the camera to prevent long latency.

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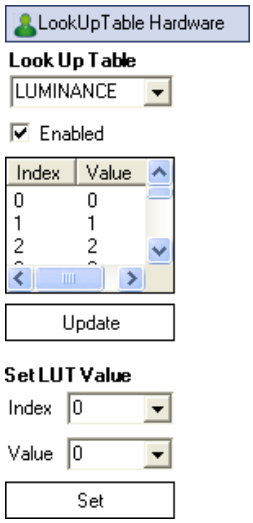
3.4.3.22 LookUpTable Hardware

CL G

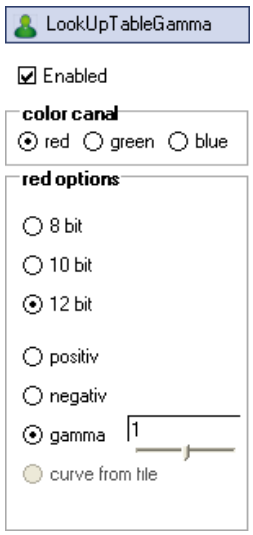


By this feature, the internal Look-Up-Table can be loaded and enabled.

Further more individual values can be set. Therefore the specific value needs to be defined and set within the area "Set LUT Value" at the bottom of the feature display. Afterwards the LUT needs to be updated via "Update" button.

3.4.3.23 LookUpTable Gamma

FW



This feature realizes a gamma correction for the three color channels red, green and blue and conduces to image data visualization.

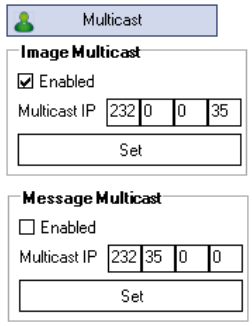
Once this feature is enabled, the possibility of optimizing every single color channel is offered.

Thereby the following options exist:

- The fineness of the LUT - and therefore the image quality - is controlled by its size 8, 10 or 12 bit whereat 12 bit causes the best quality.
- The image can be displayed either as positive or negative pattern or by employment of a specific gamma correction factor

3.4.3.24 Multicast

G



Multicasting offers the possibility to send data packets to more than one destination address – without multiplying bandwidth between camera and Multicast device (e.g. Router or Switch).

Image Multicast: set the IP for the images

Message Multicast: set the IP-adress for the messages

Notice

You must stop the camera before using this feature.

3.4.3.25 Messages

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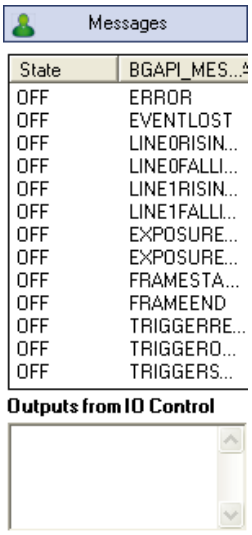
G



Here several messages of the asynchronous message channel, which is despribed in the GigE Vision™ standard, can be selected for event signaling.

On occuring selected event, a message window will pop up to inform about this fact.

3.4.3.26 Offset

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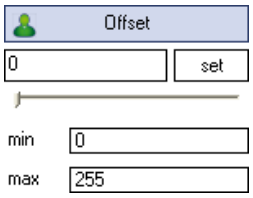
CL G FW



Here the analog offset (blacklevel) can be adjusted.

3.4.3.27 PacketDelay

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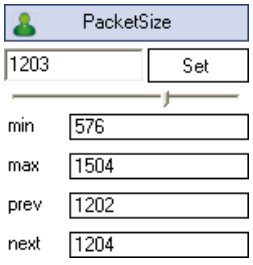
G

By this feature the so-called "inter packet gap" measured in ticks can be adjusted. Thereby one tick equals 4 Bytes of data.

3.4.3.28 PacketSize

G FW



Here the size of data packages - measured in bytes - is adjustable via entry or slider.

Notice

For the adjustment of this feature, the camera needs to be stopped.

On FireWire™ this feature is available for DCAM cameras only.

3.4.3.29 PartialScan

CL G FW

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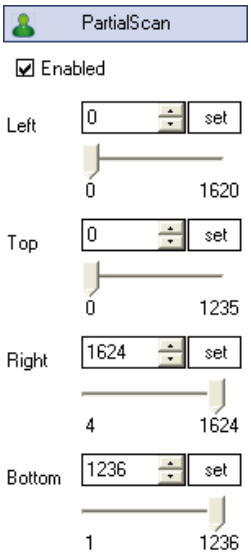

This feature offers the possibility of defining a so-called Region of interest (ROI).

Once the feature is enabled, the coordinates of the start respectively end point of the ROI can be adjusted by the sliders.

3.4.3.30 PixelFormat

CL G FW

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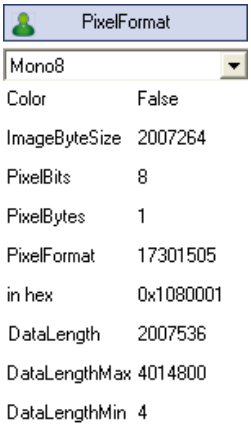


By this feature the pixelformat (depending on the current set image format) can be selected.

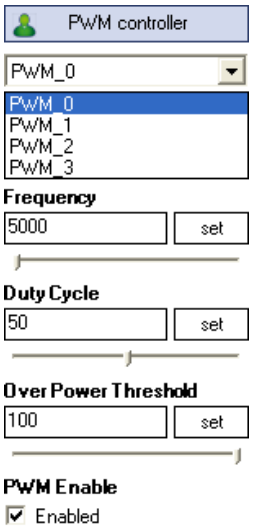
Below the drop down menu, several information on the pixel format are displayed.

Notice

The pixel format depends on the employed image format.

3.4.3.31 PWM controller

S



Special cameras of Baumer's TXG series are equipped with a so-called PWM (pulse width modulation) controller for lighting control.

Thereby a PWM controller can be selected via drop down menu.

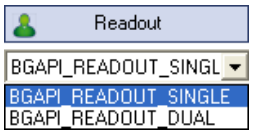
In "Frequency" the output frequency (in Hz) is adjustable via entry or slider.

"Duty Cycle" means the duty factor of pulses in percent and is also adjustable via direct entry or slider as well as the percentage for the Over Power Threshold.

Last but not least the PWM controller can be enabled.

3.4.3.32 Readout

FW

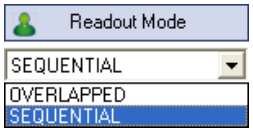


This feature depends on the sensor of the employed camera.

On "Dual" two halves are read out simultaneously which results in a shortening of the readout time.

3.4.3.33 Readout Mode

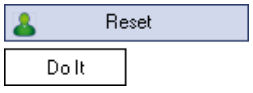
CL G



This feature refers to the timings of image acquisition. Here the operation mode can be switched between overlapped and sequential read out.

3.4.3.34 Reset

CL G FW



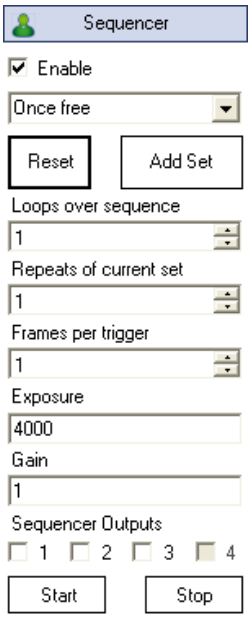
By processing this feature, the camera will be reset to factory settings.

Notice

On Gigabit Ehternet cameras please stop the camera befor reset.

3.4.3.35 Sequencer

CL G



A sequencer is used for the automated control of series of images using different sets of parameters.

Here you can make the settings for the sequencer.

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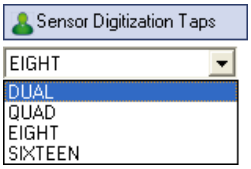
3.4.3.36 Sensor Digitization Taps

CL G



This feature depends on the sensor of the employed camera.

Here you can set the number of readout channels of the sensor.

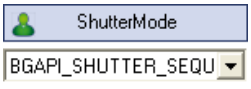
Notice

More channels increase the speed (framerate), but more channels generate a higher power.

Use only the maximum required number of channels!

3.4.3.37 ShutterMode

FW



This feature refers to the timings of image acquisition. Here the operation mode can be switched between overlapped and sequential.

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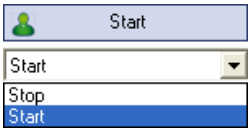
3.4.3.38 Start

CL G FW



Here the camera (image acquisition) can be started or stopped.

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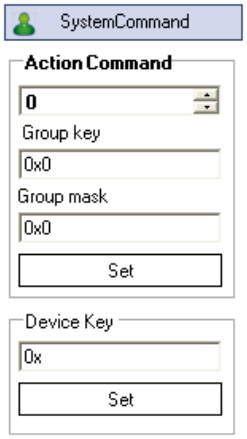
3.4.3.39 SystemCommand

CL G



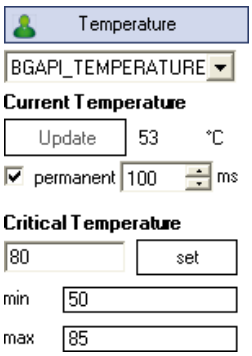
Here the behaviour of the camera on a so-called "Action Command" can be adjusted.

Therefore the ID of the expected command can be definded as well as a group key and the group mask.

The interface side adjustment possibilities are stated in section 3.5.1.5 of this document.

3.4.3.40 Temperature

CL G



For cameras with integrated temperature sensor the current temperature at the camera board can be measured and displayed by this feature.

This can occure manually via the "Update" button or in a predefined "permanent" interval.

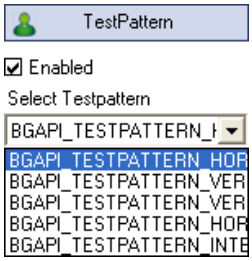
On exceedance of a defined "Critical Temperature" the camera informs about this fact within an appearing message window.

Notice

For a warning of overtemperature, "TEMPERATUREEXCEEDED" needs to be ON.

3.4.3.41 TestPattern

CL G FW



Here several test patterns, stored within the camera, can be selected and displayed within the image view.

These patterns serve as a test tool for correct data transmission between camera and PC.

3.4.3.42 Timer control

CL G FW

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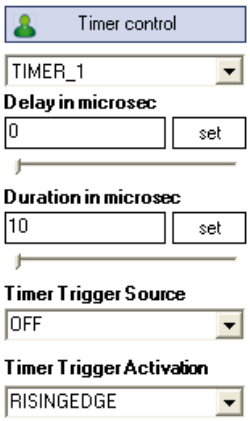

Timers were introduced for advanced control of internal camera signals.

For example the using of a timer allows you to control the flash signal in that way, that the illumination does not start synchronized to the sensor exposure but a predefined interval earlier.

3.4.3.43 Timestamp

G

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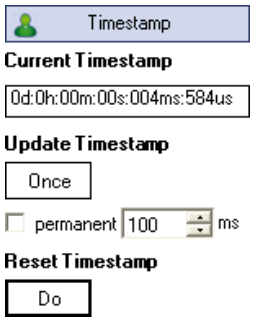

Here the current timestamp of the camera can be requested.

"Update Timestamp" provides two options:

- The current timestamp can be requested and displayed once or
- The current timestamp can be updates permanently in a user-defined interval

The timestamp can also be reset here.

3.4.3.44 Transmission Delay

G

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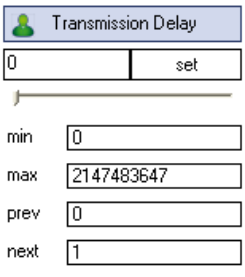

An Possibility for packet sorting in multi-camera operation is the so-called Transmission Delay, which was introduced to Baumer Gigabit Ethernet cameras in hardware release 2.1.

Due to the fact, that the currently recorded image is stored within the camera and its transmission starts with a predefined delay, complete images can be transmitted to the PC at once.

With this feature you can set the delay in ticks.

3.4.3.45 Trigger

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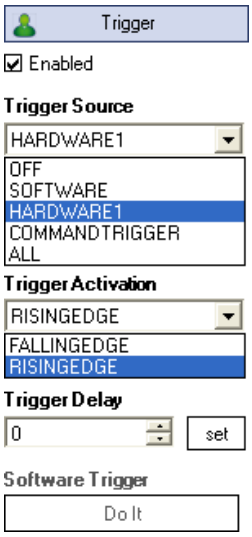
CL G FW



This feature offers the possibility to switch the camera to the trigger mode.

Once "Trigger" is enabled, the trigger source as well as the state of the trigger signal on which the camera should react is adjustable.

The button "Do it" provides the possibility of sending a software trigger to the camera.

Notice

The COMMANDTRIGGER is available on Gigabit Ethernet cameras only.

"TriggerActivation" is only selectable on trigger source HARDWARE1.

3.4.3.46 User Set

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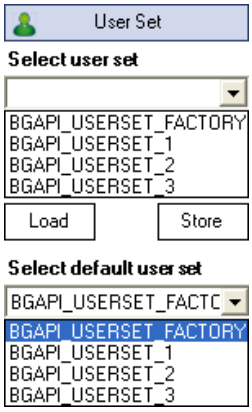
CL G FW



Here several possibilities regarding to user sets are offered:

- Loading a user set, causes a specific behaviour of the camera
- Loading of BGAPI_USERSET_FACTORY will reset the camera
- Storing of the current camera configuration to a selected user set
- Selection of a default user set and therefore specification of a specific start behaviour of the camera

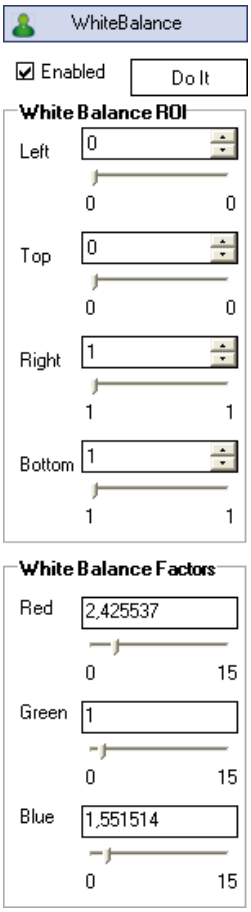
Notice

Factory settings can not be overwritten.

On Gigabit Ethernet please stop the camera before using this feature.

3.4.3.47 Whitebalance

CL G FW



Once this feature is enabled, it provides two possibilities of color correction:

- One Push White Balance (via White Balance ROI)
  Here the white balance is processed by employment of white balance factors, which are determined for a particular area (ROI) of the image. This ROI is adjustable via direct entry to the fields "Left", "Top","Right" and "Bottom" or by usage of the sliders.
- User-specific Color Adjustment (via White Balance Factors)
  Here the correction factor for each color can be adjusted user-specific.

Notice

On Gigabit Ethernet cameras the white balance ROI is full frame or the ROI of partial scan.

3.4.4 Statistics

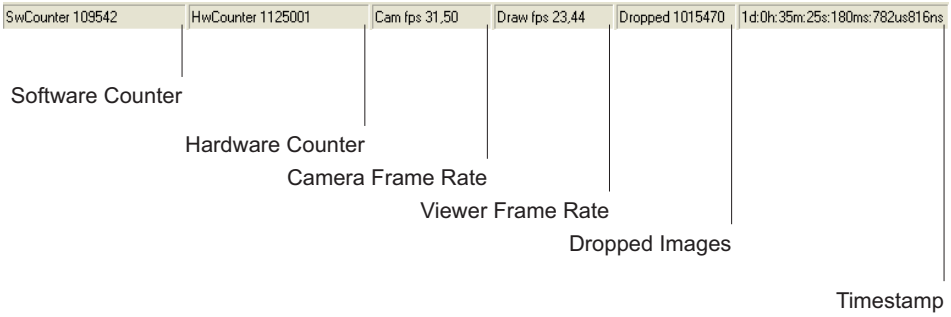
These data rely on GigE-specific features and are not available on FireWire™.

Here several information on camera and/or image are provided:

Camera information	Image information
Number of "good" frames	Image status
Number of corrupted frames	Number of resend requests
Number of lost frames	Number of resend packets
Number of resend requests	Number of lost packets
Number of resend packets	Number of packets in total
Number of lost packets	Software counter
Bandwidth in MBit/sec	Hardware counter

3.4.5 Status Bar

The status bar (Fig. 10) at the bottom of the camera window gives some information on the camera:



◀ **Figure 10**
Status bar of the Baumer-GAPI Viewer.

Information	Description
Software Counter	Number of images received by the software since the camera was started. Adjustable via frame counter feature (see Section 3.4.3.11)
Hardware Counter	Number of images aquired by the camera. Adjustable via frame counter feature (see Section 3.4.3.11)
Camera Frame Rate	Current frame rate of the camera [frames per second (fps)].
Viewer Frame Rate	Current frame rate of the Viewer [frames per second (fps)] The Baumer-GAPI Viewer is able to display up to 24 fps.
Dropped Images	Number of images, which were not processed by the Baumer-GAPI Viewer.
Timestamp	Timestamp of current displayed image.

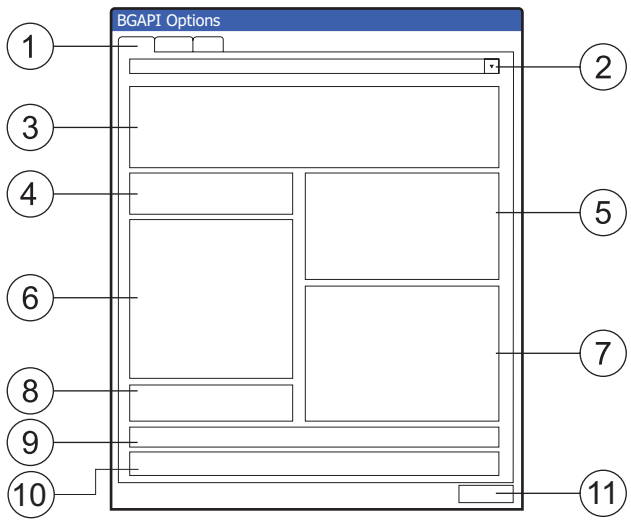
3.5 BGAPI Options

Some of the options / features are interface-specific.

Therefore the features are labeled:

Label	Description
G	This feature is available on Gigabit Ethernet.
CL	This feature is available on CameraLink® cameras.
FW	This feature is available on FireWire™.

3.5.1 System



1 - Tab "System"
2 - Interface Selector
3 - Information
4 - GVS Driver Model
5 - Force IP
6 - Command
7 - Interfaces
8 - Control Monitor
9 - Feature Status
10 - System Callbacks
11 - Close Button

3.5.1.1 Interface Selector

CL G FW

Here the respective interface, for which the options should be processed, can be selected.

3.5.1.2 Information

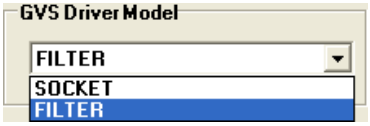
CL G FW

In this area several information on the selected interface are displayed.

3.5.1.3 GVS Driver Model

G

This drop down menu offers the possibility of driver selection. Here either the Baumer Filter Driver of the standard socket driver can be set.



Notice

Baumer recommends the employment of the Baumer Filter Driver, which increases the performance of your system.

3.5.1.4 Force IP

G

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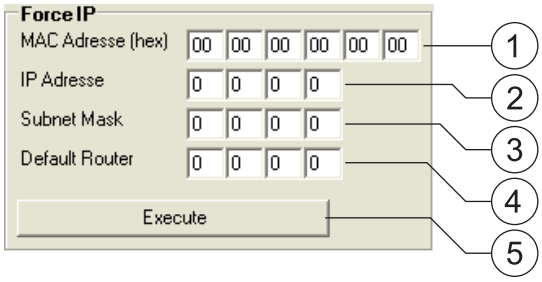
This feature offers the possibility of forcing a valid IP address to the camera.



Force IP procedure:

a) First please fill in the MAC address of the camera to the designated field (1).
   The MAC address is denoted in hex on the type plate on the bottom side of the device.
b) Next please enter a desired IP address and subnet mask, which are valid for your network, to the designated fields (2 and 3).
   If there is no persistent IP defined for your NIC, Baumer recommends to enter a IP from LLA range - like IP 169.254.x.x, subnet mask 255.255.0.0
c) Afterwards please enter the IP address of your default router (4).
   In case of LLA please leave this fiels at 0.0.0.0 - as is default.
d) Once these entries are done, click "Execute" (5) to force the data to the camera.
   The parameters are now written temporary to the device.

The camera is now reachable and you can accomplish "IPConfiguration".

Notice

The camera may not be de-energized during the Force IP process!

3.5.1.5 Command

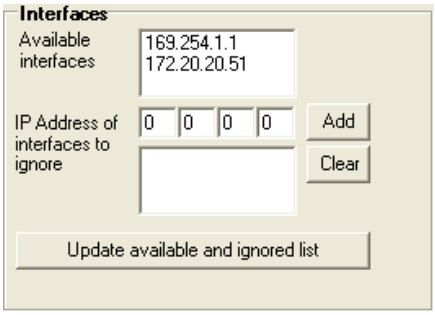
This feature offers the possibility of sending Action Commands to several devices.

In the upper part the signal type (Command ID) and the target group of cameras (Group Key and Group Mask) can be defined.

Enabling "Acknowledge" means predefined cameras should send response on incoming Action Commands. This predefinition is done by entering the IP addresses of the desired cameras to the designated field, followed by clicking the "Add" button.

3.5.1.6 Interfaces

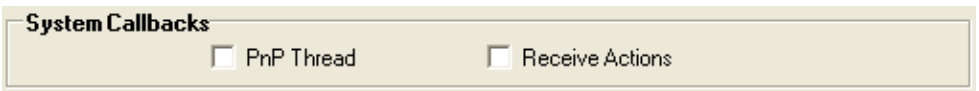
This feature offers the possibility to shorten the search for Gigabit Ethernet cameras by excluding specific interface cards.



In the upper part of this feature control all - on the PC side - available interface cards are listed with their IP address. By clicking on one of these IP addresses, this will be added to ignore list automatically.

3.5.1.7 System callbacks

This feature offers the possibility to choss which events will be shown in the message window.



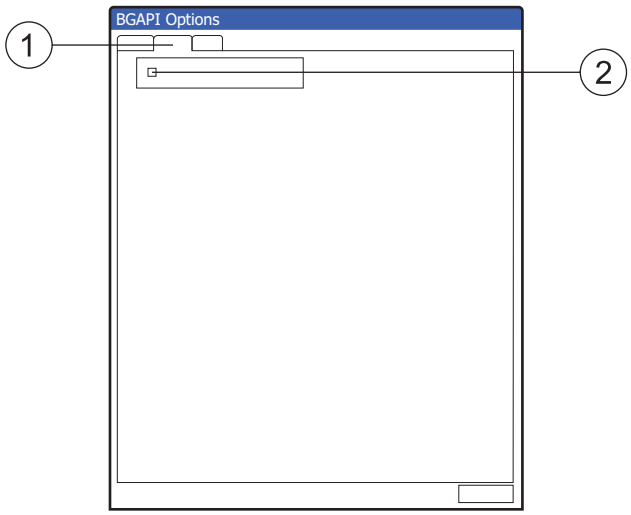
PnP Thread: Plug and Play Events (e.g. connecting of a camera)

Receiver Action: Action Commando (e.g. group key)

3.5.1.8 Feature Status

Here several information, whether a feature is supported or not, are stated.

3.5.2 Cameras



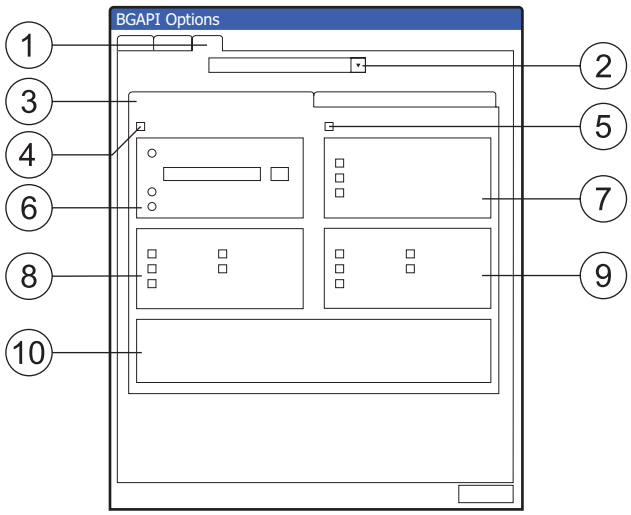
1 - Tab "Cameras"

2 - Display Options

By this feature the start behaviour of the camera is controlled.

- Enabling the checkbox "Start image acquisition direct after init" means the camera is started immediatly after the camera window is opened.
- Disabling this checkbox means the image acquisition needs to be started manually.

3.5.3 Trace



1 - Tab "Trace"

2 - Trace Support

3 - Interface Selection

4 - Create Trace Object

5 - Enable Trace

6 - Trace Output

7 - Trace Mask

8 - Trace Output Options

9 - Trace Level

10 - Reserved for future functions

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3.5.3.1 Trace Support

Currently there is only one option here - BGAPI_TRACESUPPORT_GLOBAL, which will trace events from all involved interfaces and cameras.

For future versions it is intended to offer the possibility of tracing for single devices.

3.5.3.2 Interface Selection

Here for every available interface the tracing options can be adjusted separately.

3.5.3.3 Create Trace Object

By enabling this checkbox a trace object will be created.

Notice
Creating a trace object does not mean tracing is started, you will have to enable trace and set at least one option in every box of this dialog to start tracing!

3.5.3.4 Enable Trace

Once this checkbox is activated tracing is enabled for the selected items within the boxes of this dialog.

3.5.3.5 Trace Output

Here the output of the trace object can be controlled.

Therefore the following options are available

File	The content of the trace object will be stored in a file on the PC.
Debugger	The content of the trace object will be directed to an external debugger.
Callback	The content of the trace object will be displayed in a message window.

3.5.3.6 Trace Mask

By this checkboxes the content of the trace object is adjustable.

3.5.3.7 Trace Output Options

Here several information can be added to the traced events:

Timestamp	The timestamp of the event is logged and displayed.
Timestamp Diff	The interval from the last traced event to the current one is displayed.
Prefix	not used.
New line	Linebreak is added to every output line.
Level	Here the levelfiltering (see 3.5.3.8.) can be enabled.

3.5.3.8 Trace Level

By this checkboxes, the levelfiltering can be adjusted.

Baumer

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